Submission

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Overview:

Infigen Energy (Infigen) welcomes the opportunity to make a submission. Infigen delivers reliable energy to customers through a portfolio of wind capacity across New South Wales, South Australia, Victoria and Western Australia, including both vertical integrated assets and PPAs. Infigen also owns and operates a portfolio of firming capacity, including a 123 MW open cycle gas turbine in NSW, and a 25 MW / 52 MWh battery and 120 MW of dual fuel peaking capacity in SA. Our development pipeline has projects at differing stages of development covering wind, solar and batteries and we are also exploring further opportunities to purchase energy through capital light PPAs. This broad portfolio of assets has allowed us to retail electricity to over 400 metered sites to some of Australia's most iconic large energy users.

1. The need to address variability and uncertainty

QUESTION 1: THE NEED TO ADDRESS VARIABILITY AND UNCERTAINTY

1. What are stakeholder views on the issues identified, in particular, on whether the primary issue is appropriately characterised as an increased risk of insufficient in-market reserves being available to meet net demand, due principally to forecast uncertainty and net demand variability as the penetration of VRE generation increases?
2. What are stakeholder views on the materiality of these issues? For example, are the issues material enough to warrant the further development of a reserve service market?
3. If not, what further information would be required relating to the nature of the issues facing the power system before progressing the development of a reserve service market?

As the NEM transitions to a low emissions future, there has been a renewed focus on ensuring reliable, secure supply, particularly in response to new modes of failure. We are concerned that this has led to a range of policy proposals that are simply designed to prop up the financial viability of incumbent players, rather than being levers to address specific policy objectives. Policies should be designed so as to avoid paying for services that the market already incentivises (and delivers).

We agree that the need for additional market changes is uncertain. The current NEM design has been highly successful at delivering affordable, reliable supply. The Reliability Panel sets both the reliability standard and the Market Price Cap at economically efficient levels. However, as governments seek greater certainty of reserves

and higher levels of reliability, it will be costly to pursue this through incentivising greater physical capacity, or increasing risks through even higher Market Price Caps.

Similarly, while RERT provides a mechanism for procuring reserves, it was intended to be an emergency service. It is an opaque market (some would argue that it is not a market), with unclear procurement criteria. Because it is explicitly out of market reserves, providers must make conservative estimates of their likely usage and opportunity costs – and this prevents these resources from supporting low-cost contracting to consumers. This then represents a significant cost to consumers, and should not be considered an enduring part of market operation.

Therefore, we think it prudent to consider and develop alternative in-market reserve mechanisms. Organised spot markets for reserves allow participants to make the most efficient offers based on real-time conditions, and provide a transparent price signal for investors (or demand response aggregators, etc.)

Approach to analysis

Infigen supports the AEMC's analysis of the issues. In particular, the AEMC has, in our view, accurately described the distinction between *expected* reserve requirements (which can be managed through market signals) and *unexpected* requirements driven by real-world political economy, and not economic, considerations (which may require additional services).

Expected reserve requirements

While ramping requirements are likely to increase in the NEM, there is likely to be a corresponding increase in highly flexible capacity. This includes 550 MW of batteries identified by the AEMC, 2-3 GW of flexible storage in NSW (legislated), and 2 GW through Snowy 2.0. This alone would be 4-5 GW of additional flexible resources, with many more projects proposed across the NEM.

It is highly likely that these resources will be available to manage (or at least smooth) ramping requirements across the day *if* they are anticipated or if there is a reasonable basis to expect they might occur. For example, vertically integrated customer-centric retailers such as Infigen continually monitor both projected prices and sensitivities around the supply-demand balance (using both centralized (AEMO) and bespoke models) and hold flexible resources in reserve to manage likely and possible events.

We also note that events can be unlikely but still expected. For example, outages of aging coal units can be expected to occur, without knowing when. Similarly, ramps in VRE or changes from day ahead forecasts are possible and can be effectively managed by prudent participants.

'Unforecasteable' events

We agree that the primary risks to the market are 'unforecasted' – and 'unforecastable' – events. Whether or not these events impact on the reliability standard (i.e., whether they are credible or protected events), there may be a role for managing these risks at a centralized level.

While this could potentially include non-credible events (and noting Operating Reserves: can assist with managing these), Infigen's focus is on events that might be considered credible in hindsight. This can include operational timescales (material changes in demand forecasts due to unexpected heatwaves) and planning timescales (the short-notice retirement of coal units due to unexpected repair costs as seen with Hazelwood).

It is not credible to expect prudent investors to manage risks using supply side infrastructure for events consider (rightly or wrongly) less likely than one in ten years. Furthermore, it is unlikely to be efficient to develop new capacity to manage those events (i.e., physical units that are only run incredibly rarely). Instead, the AEMC should focus on ways of empowering customers and allowing flexible loads to participate in managing reliability through demand response. This should not conflict with in-market demand response as part of a portfolio (retailer or otherwise), but may allow for greater participation – being paid to provide voluntary demand response as an alternative to AEMO or TNSP directed load shedding.

Effectively, such an approach would allow customers to choose their own price points for different levels of reliability: our proposed Operating Reserves framework would help unlock the two-sided market.

Critically, this role is currently being filled with the RERT (as well as direct government intervention in the market). Establishing a new, efficient market-based service (that is implicitly cooptimised with the energy market in (or close to) real-time) will be lower cost for consumers.

2. Options to address variability and uncertainty of net demand

QUESTION 2: OPTIONS TO ADDRESS VARIABILITY AND UNCERTAINTY OF NET DEMAND

1. To what extent could any or all of the incremental improvements to current arrangements set out in section 6.1 address the issues sufficiently to negate the need to implement a new reserve service market? Are there any other incremental improvements that should be considered?
2. Which of the reserve service market options set out in section 6.2 is the most preferable to address the issues raised in Chapter 5, taking into account the way different technologies may operate under each option and the trade-offs between the options?
3. Are there any other reserve service market options not presented here (or variations on the options, such as the variation discussed in section 6.2.3) that would be preferable? If so, why?

In our view, the current market functions well and will continue to do so. However, if significantly higher levels of reliability are desired due to real-world political economy constraints, additional mechanisms will be required (while higher MPCs will drive reliability, it creates new risks for market participants; simply increasing the MPC indefinitely may not be the least-cost approach).

Ultimately, higher reliability requires additional resources (particularly demand response) to be developed, specifically resources with high opex (or opportunity cost) but low capex (availability costs) that do not yet participate in the market. This means creating new incentives or mechanisms in the market (rather than just reinforcing signals that already exist).

Operating Reserves are a Resource Adequacy Mechanism. By creating additional demand in the market for reserves, additional resources must be developed (just like the Raise Contingency and Raise Regulation FCAS services create a market for resources beyond what is needed for the energy market).

An Operating Reserves framework provides a clear signal to investors, and confidence to AEMO and governments that sufficient resources will be available to manage the grid.

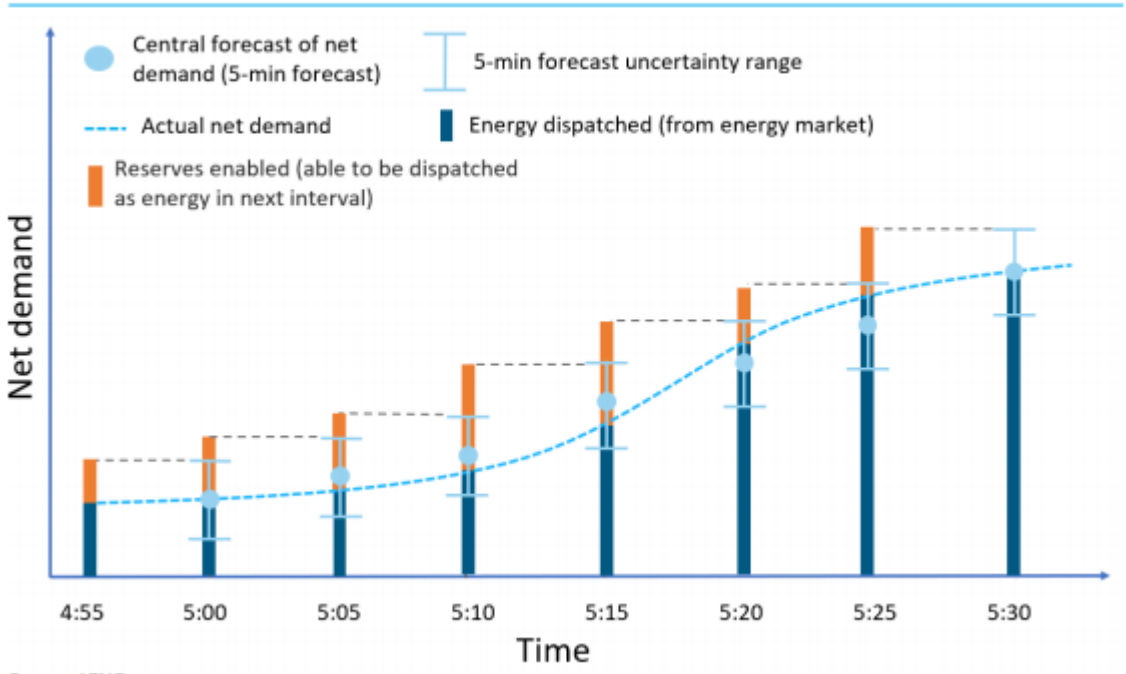
We provide the following general comments, and then specific comments on the four schemes presented by AEMC.

- AEMO's FUM metric is a valuable approach to risk management and assessment, and allows for a more dynamic approach to managing contingency events, including indistinct events and
- In parallel with a more formal mechanism, Infigen supports managing risks through greater information provision to participants, particularly around the FUM and its inputs. For example, this could be used to inform alternative pre-dispatch sensitivities.
- However, there is limited ability of mechanisms (e.g., day-ahead PASA) to manage material uncertainties that occur in real-time.
- We do not see a need for a more centralised approach to unit commitment or dispatch. As noted by the ESB, there have been no instances of established resources not being available on operational timeframes to manage *forecasted* supply-demand imbalances. A much clearer problem definition is required before implementing this, including for essential system services.
- As noted in our previous submissions, the volume and location of reserves to be procured is important, and will require advice from AEMO and the Reliability Panel. This includes how reserve sharing between regions should be managed. We note this ties closely to the volume of other reserves (FCAS) that are procured, as well as PASA calculations and LOR and FUM calculations. A comprehensive review of these services should be undertaken to ensure all are on a consistent basis.
- While net demand is a convenient metric for the combined variability of demand and VRE, we caution that the two components are fundamentally different and VRE can deliver reserves in various forms and so should not be disregarded.

2.1 Option 1 – Co-optimised operating reserve

The proposed co-optimised operating reserves market will require the full quantity of unexpected and unexpected reserves to be available in the subsequent dispatch interval relative to the currently dispatched resources. Participants would be paid a premium for reserving capacity for the next period, which would incentivise participants to make headroom available, and therefore increase supply.

Figure 6.1: Co-optimised operating reserve market



Source: AEMC.

- In this scenario, the distinction between "unexpected" and "expected" ramp requirements would be blurred
- It is not clear how AEMO would manage expected reductions in availability. For example, energy limited resources, planned coal shutdowns, units bidding unavailable due to not wanting to run, etc.
    - Is the target of this service "headroom" in the next DI, or simply headroom above *currently* dispatched resources? For example, assume no expected ramp in net demand and 200 MW in unexpected ramp. If AEMO's intent is to maintain headroom then (assuming flat demand) if supply is projected to decline by 100 MW, AEMO may have to procure the desired headroom *plus* an additional 100 MW of reserves for the next period (300 MW). Alternatively, if AEMO is only procuring the expected & unexpected ramp, then AEMO will only have 100 MW of headroom for unexpected events.
    - This is likely to lead to swings in the procurement volume. While this does not change the underlying volume of efficient reserves required (assuming that participants are monitoring ST PASA, etc.) it will increase complexity.
- Could a currently operating unit bid its energy into the reserves market in the next dispatch interval rather than the energy market, if its intent is not to run but would be willing to do so if needed?
- This approach more substantially breaks the NEM's "energy only" approach than Option 4, in that resources currently not delivering energy at T+0 may be paid more for their energy in T+5. This provides an incentive to withhold energy from the current period, and hence deliver more reserves in the short-run, as is AEMO's intent
- The MPC would almost certainly need to be reduced (for the same reliability standard) as now the probability-adjusted expectation of an MPC event is supplemented by the reserve market revenue.

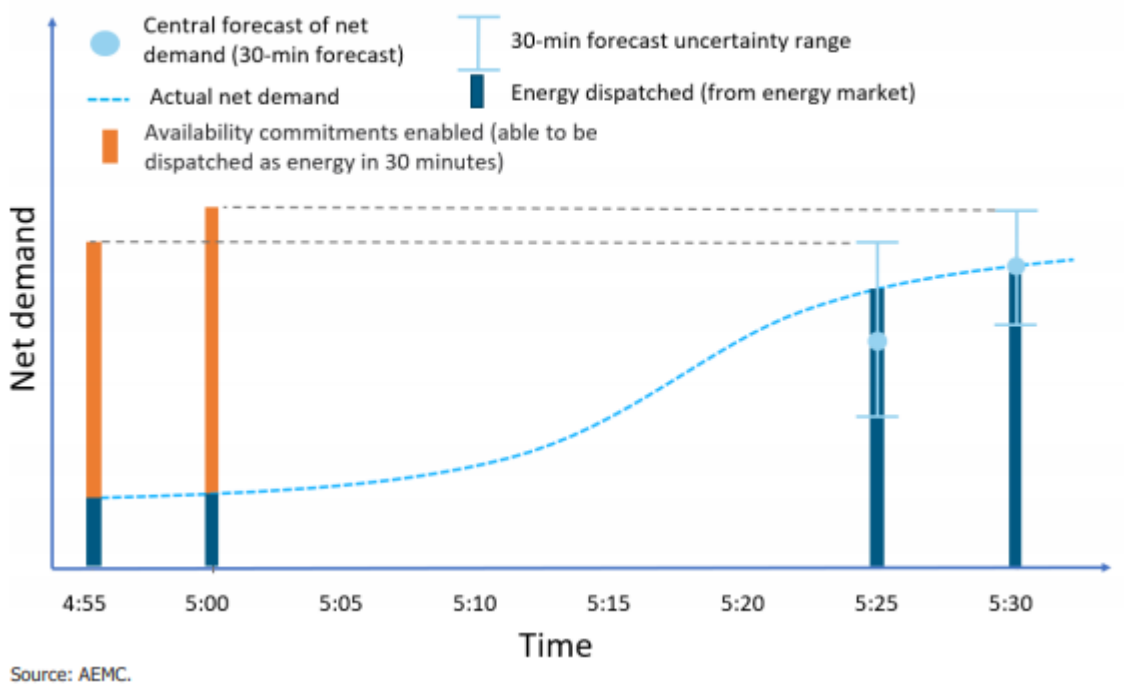
Most notably, this obligation does not seem fundamentally different from the Delayed Raise service, which obligates participants to be available within 5 minutes. This is faster than is needed for managing non-credible events (which requires recovery within 30 minutes). Mandating an unnecessarily fast response may not draw additional supply into the market – particularly demand response. It is therefore unclear whether this option would solve the problem by incentivising *new* supply of reserves into the market (particularly from the demand side).

The appropriate treatment of units with fast-start inflexibility profiles (FSIP) would need to be considered. We consider there is a difference between the response required for reliability (that dispatch interval) and broader resilience (recovering the system from unexpected events, within 30 minutes).

2.2 Option 2 – Co-optimised availability market

Infigen's comments on Option 2 are similar to Option 1. This option provides additional flexibility to providers as they have a "pre-activation" period of 30 minutes, which may unlock additional demand response resources. However, the "activation" period would remain 5 minutes (a dispatch interval) as resources are dispatched directly in the market. We note the complexities of declining availability from non-VRE resources is likely amplified in this option. In particular, AEMO would need to make greater assumptions about the future dispatch and availability of energy limited resources.

Figure 6.2: Co-optimised availability market



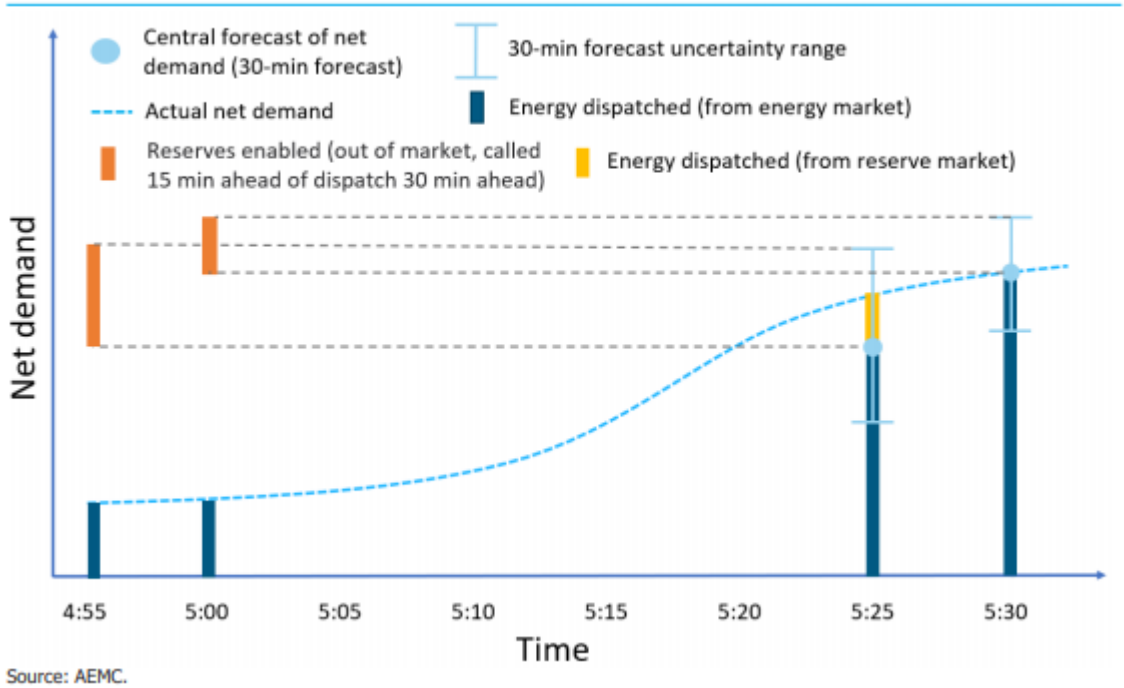
Source: AEMC.

2.3 Option 3 – callable operating reserve market

This is Infigen's preferred option, and is effectively a centralised hedge against unserved energy rather than against high prices. In this approach:

- Expected ramp events continue to be managed by the existing market and price signals. As noted by AEMC, we agree that no problem has been identified here.
- Additional headroom would be procured for the period T+30. These resources commit to being held in reserve at T+30 *unless* they are needed to avoid unserved energy.
- Procured resources forego energy market revenue in exchange for an insurance payment. As such, it does not distort the existing role of the Market Price Cap in the market, which incentivises retailers to hedge their expected load.

Figure 6.3: Callable operating reserve market



Source: AEMC.

Increased participation

We expect that this market would be supplied primarily by:

- demand response from resources that would otherwise not participate in the energy market (either at all, or for participation beyond contracted levels). For example, resources with opportunity costs above the market price cap ($15,000/MWh);
- available headroom on existing resources (including curtailed VRE or coal units at minimum load), at low cost. Note that this capacity would then not be available for *price* hedging, and so retailers would need to maintain sufficient headroom; and
- resources with high costs that would not otherwise run, and therefore have low opportunity costs.

In particular, we see this as a valuable role for aluminium smelters which do not generally wish to turn off, but can do so for a limited number of events each year if it supports the efficient operation of the NEM. Resources would receive an ongoing availability payment (when enabled in the market), but only be called as a last resort against load shedding.

Effectively, this would become an “in-market” RERT, with greater transparency. Because providers would not receive fixed out-of-market payments, they would be able to switch between the OR market and the energy market. For example, smelters might have a contract for three activations with a retailer, but could at times offer additional demand response into the OR market *if* their operational constraints permitted.

Impact on Market Price Cap and reliability standard

As with the other approaches, it may be necessary to adjust the Market Price Cap in response to the introduction of the scheme. Infigen considers that the reliability standard and the corresponding Market Price Cap are best set at a national level by the Reliability Panel, reflecting consumer preferences.

However, this approach to an Operating Reserves market would potentially allow risk-averse governments to manage their preferred jurisdictional level of unserved energy. For example, the volume of Operating Reserves procured could be to ensure total unserved energy was 0.0006%. Governments could also fund Operating Reserves directly (through directing AEMO to procure a certain quantity and paying the appropriate cost), minimizing the burden on electricity consumers.

Impact in planning timeframes

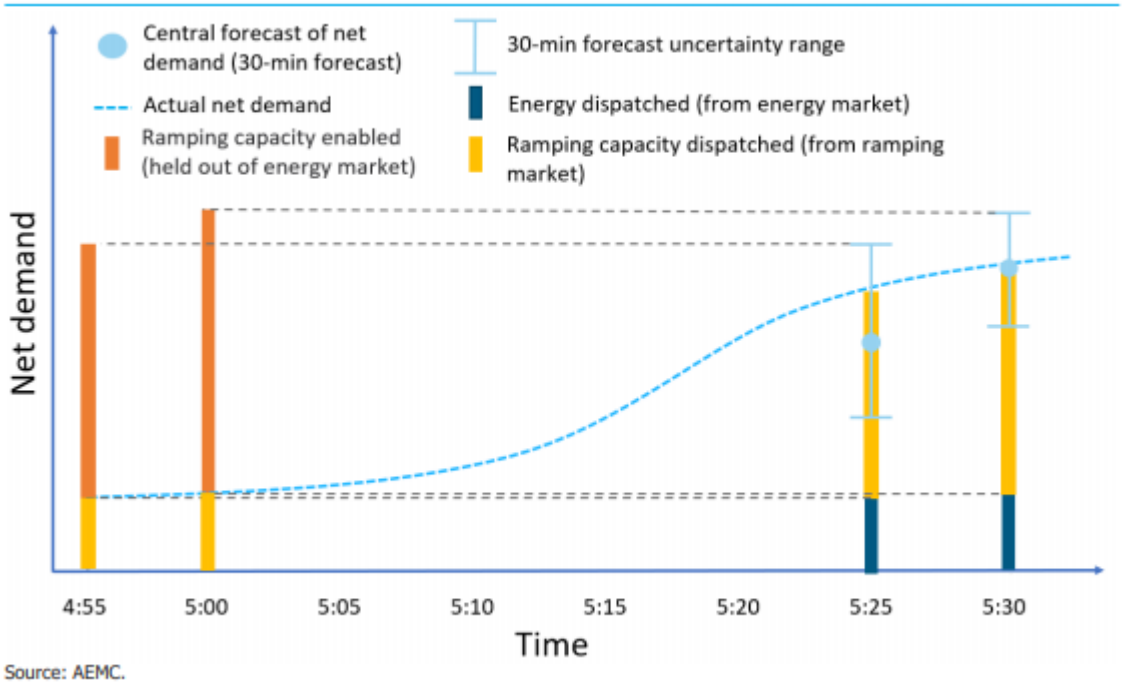
A distinct “above the market” service will create clarity for investors, including in demand response aggregators. If implemented progressively, it will create the signal for additional capacity in the market (i.e., if 200 MW of reserves are needed at all times, then an additional 200 MW of capacity or demand response will be required in the market). This will directly increase market supply above the levels determined by the MPC.

2.4 Ramping commitment market

Infigen acknowledges the constructive approach to identify potential gaps in the market and to consider whether alternative services are required. As noted, we agree that after further investigation no clear ramping need has been identified and as such the use case of this service does not appear well defined. In particular, it is not clear the priority order for dispatching the withheld “ramping reserves” and the dispatch of other resources in the energy market, and we consider that 5 Minute Settlement will strengthen existing signals for additional ramping if it is warranted.

More broadly, the focus on “ramping” in MWh/min does not seem relevant in the long-term, given that the majority of resource in the future will have very fasting ramping capabilities (batteries, PHES, curtailed VRE, demand response, etc). For example, it is credible that all coal plant in New South Wales will close within the next decade, being replaced with flexible resources. We suggest the focus should be on demand response and other resources not currently utilised in the market.

Figure 6.4: Ramping commitment market



Source: AEMC.

2.5 Summary

Infigen supports Option 3 (callable operating reserves model), where resources are only activated by AEMO to avoid load-shedding or the credible risk of load shedding. Infigen does not support the other options at this time. Importantly, we see that only Option 3 will have the desired impact of incentivising new supply of (mainly demand response) resources that are well suited to addressing the problem of 'unforecastable' events.

Conclusion:

We look forward to the opportunity to continue to engage with the AEMC. If you would like to discuss this submission, please contact Dr Joel Gilmore (Regulator Affairs Manager) on joel.gilmore@infigenenergy.com or 0411 267 044.

Yours sincerely

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